Component of Statistics Canada Catalogue no. 82-003-X
Health Reports

Article

Measures of language outcomes using the Aboriginal Children's Survey

by Leanne C. Findlay and Dafna E. Kohen

January 2013

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

email at infostats@statcan.gc.ca,

telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following toll-free numbers:

- Statistical Information Service 1-800-263-1136
- National telecommunications device for the hearing impaired 1-800-363-7629
- Fax line 1-877-287-4369

Depository Services Program

- Inquiries line 1-800-635-7943
- Fax line 1-800-565-7757

To access this product

This product, Catalogue no. 82-003-X, is available free in electronic format. To obtain a single issue, visit our website, www.statcan.gc.ca, and browse by "Key resource" > "Publications."

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "About us" > "The agency" > "Providing services to Canadians."

Published by authority of the Minister responsible for Statistics Canada

© Minister of Industry, 2012

All rights reserved. Use of this publication is governed by the Statistics Canada Open Licence Agreement (http://www.statcan.gc.ca/reference/licence-eng.html).

Cette publication est aussi disponible en français.

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Standard symbols

The following symbols are used in Statistics Canada publications:

.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published
*	significantly different from reference category ($p < 0.05$)

Measures of language outcomes using the Aboriginal Children's Survey

by Leanne C. Findlay and Dafna E. Kohen

Abstract

Background
Speech and language skills are an important developmental milestone for all children, and one of the most prevalent forms of developmental delay among Aboriginal children. However, population-based indicators of Aboriginal children's language outcomes are limited.

Data and methods
Data from the Aboriginal Children's Survey (ACS) were used to examine measures of language for Aboriginal children who were 2 to 5 years of age. Responses to ACS questions on ability in any language were examined in exploratory factor analyses to determine possible language indicators. Construct validity was examined by regressing language outcomes onto socio-demographic characteristics known to be associated with children's language.

Results
Four language outcomes were identified and labelled: expressive language, mutual understanding, story-telling, and speech and language difficulties.

Interpretation
The conceptualization of items from the ACS into separate language indicators can be used by researchers examining young Aboriginal children's language outcomes.

Keywords
Comprehension, language delay, language development, speech disorders, verbal learning

Authors
Leanne C. Findlay (613-951-4648, leanne.findlay@statcan.gc.ca) and Dafna E. Kohen (613-951-3346, dafna.kohen@statcan.gc.ca) are with the Health Analysis Division at Statistics Canada, Ottawa, Ontario, K1A 0T6.

One of the most prevalent forms of developmental delay among Aboriginal children pertains to language,[1,2] with speech-language difficulties being reported by parents of up to 10% of Aboriginal children.[3,4] Speech-language deficits and delays account for the largest percentage of diagnoses of special needs.[5]

Language develops rapidly from infancy through the preschool years. The period from 0 to 60 months is the most sensitive for language development and the most opportune to promote language learning and intervene to remedy difficulties.[6] Early interventions have higher returns than later interventions.[7] Even before children enter school, weak language skills are associated with behaviour and attention problems,[8,9] poorer school readiness,[10,11], and poorer cognitive performance,[12] literacy and educational achievement.[13,14] In addition, early language development is important for social inclusion and cultural identity.[15]

Knowledge about Aboriginal children's language development is limited.[16-18] Until recently, Aboriginal children have not been purposively sampled in national longitudinal cohort studies of Canadian children (for instance, the "National Longitudinal Survey of Children and Youth"[19] and "Understanding the Early Years").[20]

Monitoring, screening and diagnostic tools have been developed and standardized on a general population of Canadian children, most of whom have English or French as their first language.[21] These tools do not account for cultural differences in speech patterns[22] or the use of non-standard English/French,[23] and are often administered by people unfamiliar with Aboriginal sociolinguistic practices or cultural differences. As a result, Aboriginal children's linguistic skills[22,24] may be underestimated.

Standardized tools assess domains such as *expressive* language—the production of language (speech)—and *receptive* language—understanding of language.[10,25,26] However, other indicators may be more relevant for Aboriginal children. For instance, interactions in which the emphasis is on reciprocal interchanges—mutual understanding— and story-telling may be important for early development.[22,24,27-29] However, neither mutual understanding nor story-telling is

commonly described as a language indicator in the literature.

To avoid reliance on standardized measures, maternal reports have been widely used in the study of non-Western children's language acquisition and skills.[24,30,31] In fact, because the validity of existing language assessment measures is questionable for Aboriginal children,[24,27] parent reports are a good alternate source of information.

The goal of the current study was to describe how items collected from parents/guardians for a nationally representative sample of Aboriginal children (off reserve) as part of the 2006 Aboriginal Children's Survey (ACS)[32] could be used as language indicators. Because this study concerns language development generally, outcomes in any dialect or language, rather than in a specific Aboriginal language, are examined.

Methods

Data from the ACS were used to investigate language outcomes among Aboriginal children aged 2 to 5 years. The ACS was developed by Statistics Canada and Aboriginal advisors from across the country, and conducted jointly by Statistics Canada and Human Resources and Skills Development Canada. The target population consisted of First Nations children living off reserve, Métis children, and Inuit children. (Although the ACS used the term, "North American Indian," the term, "First Nations," is used throughout this report.) The survey excluded children living on reserves in the provinces; however, all children living in the territories and children in some First Nations communities in Quebec were included. The sample was selected from children under age 6 who had been identified in the 2006 Census as North American Indian and/or Métis and/or Inuit; and/or had treaty or registered Indian status; and/or had Indian Band membership; and/or had Aboriginal ancestors. The overall response rate was 81%, yielding a sample of 12,845 that represented a population of approximately 135,000 Aboriginal children under age 6. Detailed information about the sample and survey is available elsewhere.[32]

The sample for the current study consisted of children aged 2 to 5 who were reported to have single or multiple Aboriginal identity (n = 7,417). Parents/Guardians of children younger than age 2 were not asked to complete all the sections relevant to the language outcomes on the ACS.

Measures

Socio-demographic characteristics

The parent/guardian (a biological parent for 90% of First Nations children living off reserve, 94% of Métis children, and 81% of Inuit children) reported the child's age and sex, parent/guardian education, and family structure (single- or dual-parent household). Household income, obtained from the 2006 Census, was adjusted for the number of people in the household.

Language outcomes

All ACS items that reflected children's language outcomes were explored in this analysis.

The parent/guardian was asked:

- "Has the child ever expressed his/her needs using full sentences?"
- "Has the child ever expressed his/her needs using 2 or 3 words?"
- "Has the child ever expressed his/her needs using a single word?"
- "Has the child ever expressed his/her needs using sounds other than crying?"

The response options were: "yes, all the time," "most of the time," "sometimes," "rarely" and "no."

On a five-point Likert scale (all of the time, most of the time, sometimes, rarely, and never), parents/guardians were asked:

- "How often can other people understand what he/she is saying?"
- "How often does the child understand you when you speak to him/her?"
- "How often can you understand what he/she is saying?"

Respondents were also asked whether the child had "ever told or retold a story using his/her own words" or "ever drawn a picture and then told a story about what he/she had drawn" (yes/no).

Finally, respondents were asked if the child had a speech or language difficulty, and if so, if it had been diagnosed. Those who reported a diagnosed speech or language difficulty were asked if the child had received treatment for the condition.

Analyses

An exploratory factor analysis (EFA) with geomin rotation using a Robust Weighted Least Squares (WLSMV, polychoric) estimator was performed to determine if the items reflected a single or a set of core factors. To address the issue of ceiling effects in the data, items were considered as categorical variables. The analysis was conducted first for all Aboriginal children, and then for each Aboriginal group (First Nations children living off reserve, Métis children, and Inuit children). Geomin rotation accounts for the correlation of the factors identified.[33]

Factor loadings were generated for each variable, representing the extent to which the variable reflected the underlying latent factor. Factor loadings of .32 to .44 were considered poor; .45 to .54, fair; .55 to .66, good; .63 to .70, very good; and .71 or more, excellent.[34]

To determine the appropriate number of factors to be retained from the EFA, a parallel analysis was conducted. In a parallel analysis, an acceptable number of factors is indicated by determining the eigenvalues obtained with the dataset which exceed those obtained from randomly generated datasets.[35]

The EFA excluded two yes/no response items on story-telling and speech-language difficulties because parents were asked about speech and language in a different manner (including a different scale) than the other language questions.

The Comparative Fit Index (CFI),[36] the Tucker and Lewis Index (TLI),[37] and the Root Mean Square Error of Approximation (RMSEA)[38] were used to

assess the goodness-of-fit of the model and the appropriate factor structure. CFI and TLI values of 0.90 or more indicate an acceptable fit,[37,39] and RMSEA values of 0.06 or less indicate a good fit.[37] The chi-square (χ^2) test statistic was not reported because of its sensitivity to sample size.[38]

Finally, to assess the validity of the language items, socio-demographic factors known to be associated with language (child gender and age, household income, parent/guardian education, and family structure) were regressed onto the four language outcome scores. Based on earlier research, being male,[40] low household income,[41,42] low parent/guardian education,[43] and single-parent status were hypothesized to be associated with poorer language outcomes. Using the factor structure obtained in the EFA and creating a mean of the two yes/no story-telling items, scores on each factor were used in linear regressions predicting the expressive, mutual understanding, and story-telling indicators. Logistic regression was used to predict the odds of having a speech-language difficulty. Speech-language difficulty was also regressed onto the other three language indicators to further examine construct validity.

Preparation of the data and calculation of descriptive statistics were conducted in SAS version 9.1; factor analyses (EFA) were conducted using MPLUS version 6.11.[33] Only cases with no missing data on any of the items were included in the EFA (n = 6,681). The advantage of MPLUS over SAS for EFA is that it allows items to be specified as ordered categorical variables rather than as continuous variables. Normalized survey sampling weights were used in the descriptive and regression analyses to account for the unequal probability of selection among respondents, unit non-response, and post-stratification. A bootstrapping technique was applied to produce estimates of variance.[44]

Results

Exploratory factor analysis

Two factors emerged and were labelled expressive language and mutual understanding (RMSEA=.034, CFI = .999, TLI = .997) (Table 1). Retention of two factors was supported by the parallel analysis—the eigenvalues obtained for the two factors in the EFA were greater than the first two eigenvalues in the parallel analysis. A simple structure was revealed, whereby each item loaded onto one factor only (with excellent loadings). The factors were significantly correlated with one another (r = .53).

Expressive language

In the ACS, expressive language items were asked sequentially. That is, parents were asked if children used sentences to express their needs, and if so, how often. For scoring purposes, if children used sentences, they were assumed to be capable of using levels of communication requiring lower skills "all of the time." However, this creates an artificial numerator (and denominator) for the frequencies of lower levels of communication skills, and also raises an issue of non-independence of the expressive language item responses. Therefore, an overall measure of expressive language was created by assuming a hierarchy of skills, with sentences being the most sophisticated, followed by use of 2 or 3 words, then single words, then sounds. An overall expressive language score was created, with 16 indicating that the child used sentences all the time (15=most of the time, 14=some of the time, 13=rarely); 12 indicating that the child used 2 or 3 words all the time; 8 indicating that the child used single words all the time; and 4 indicating that the child used sounds all the time. An expressive language score of 0 indicates that the child never used sounds to communicate (Table 2).

While this strategy creates a continuous score for expressive language, normality of the distribution is an issue, as only 33% of the sample did not receive the maximum score of 16. Analysis of the relationship between the expressive language score and child age suggests that as age increases, so does the percentage of children attaining the maximum score (39% at age 2; 81% at age 5).

Mutual understanding and story-telling

Mean scores for the mutual understanding outcome and for story-telling were calculated based on three items for mutual understanding (internal consistency (α) = .73) and two items for story-telling (α = .73) (Table 2). Because of the small number of items constituting each score, only cases with complete data were included in the calculations. A ceiling effect emerged for both indicators, with 38% of the sample scoring the maximum for mutual understanding (12% at age 2; 59% at age 5), and 77% scoring the maximum for story-telling (43% at age 2; 94% at age 5).

Table 1
Factor loadings for language items on Aboriginal Children's Survey, household population aged 2 to 5, Canada, 2006

Item	Factor 1 Expressive language	Factor 2 Mutual understanding
How often does the child express his/her needs using full sentences?	**0.699**	0.289
How often does the child express his/her needs using 2 or 3 words?	**1.003**	-0.003
How often does the child express his/her needs using a single word?	**1.002**	-0.003
How often does child express his/her needs using sounds other than crying?	**0.997**	0.002
How often can other people understand what he/she is saying?	0.052	**0.849**
How often does the child understand you when you speak to him/her?	0.119	**0.506**
How often can you understand what he/she is saying?	-0.050	**0.935**

Note: Bold values indicate that the item loads onto the corresponding factor.
Source: 2006 Aboriginal Children's Survey.

Table 2
Item structure for language outcomes and means for Aboriginal Children's Survey, household population aged 2 to 5, Canada, 2006

Subscale	Item	Mean score	Standard error	Range
Expressive language	How often does the child express his/her needs using full sentences?	15.07	0.02	1 to 16
	How often does the child express his/her needs using 2 or 3 words?			
	How often does the child express his/her needs using a single word?			
	How often does the child express his/her needs using sounds other than crying?			
Mutual understanding	How often can other people understand what he/she is saying?	4.50	0.01	1 to 5
	How often does the child understand you when you speak to him/her?			
	How often can you understand what he/she is saying?			
Story-telling	Has the child ever told or retold a story using his/her own words?	0.84	0.00	0 to 1
	Has the child ever drawn a picture and then told a story about what he/she had drawn?			

Source: 2006 Aboriginal Children's Survey.

Speech and language difficulties

The final language indicator was parent/guardian reports of speech-language difficulties. Respondents were also asked if the condition was diagnosed, and if the child had received treatment for it. In the ACS sample of 2- to 5-year-olds, 12% of children had a speech-language difficulty, 75% of whom were diagnosed. Of the children with a diagnosed speech-language difficulty, 82% had received treatment.

Aboriginal identity groups

Additional analyses examined whether the items loaded to an analogous factor structure for each Aboriginal group (First Nations children living off reserve n = 3,257; Métis n = 2,454,; Inuit n = 1,061). The items were associated with two similarly labeled factors across the three groups (First Nations: RMSEA = 0.054, CFI = 0.997, TLI = 0.992, correlation between factors (r) = .49; Métis: RMSEA=0.011, CFI = 1.00, TLI = 1.00, r = .57; Inuit: RMSEA=0.029, CFI = 0.999, TLI = 0.997, r = .41). Speech-language difficulty was reported for 13% of 2- to 5-year-old First Nations children living off reserve and 12% of Métis children (for 75% of them, the difficulty had been diagnosed, and of those with a diagnosed difficulty, more than 80% had received treatment). Among Inuit children, 7% were reported to have a speech-language difficulty, 70% of whom had been diagnosed. Of the Inuit children with a diagnosed speech-language difficulty, 71% had received treatment.

Associations with socio-demographic characteristics

To assess the validity of the four indicators identified in this analysis, associations with socio-demographic characteristics known to be related to children's language development were examined. Except for family structure, all characteristics were associated with expressive language, mutual understanding, and story-telling in the expected direction (Table 3). Specifically, boys had lower scores than did girls, and older children and children living in households with higher income and higher parent/guardian education had higher scores. In addition, boys and older children were more likely than girls and younger children to have speech-language difficulties, and children living in higher-income households were less likely to have speech-language difficulties, compared with children in lower-income households. Finally, children with higher expressive language, mutual understanding and story-telling scores were less likely than those with

Table 3
Regression analysis predicting language outcomes, household population aged 2 to 5, Canada, 2006

	Expressive language			Mutual understanding			Story-telling			Speech and language difficulties		
											95% confidence interval	
Predictor	Beta	Standard error	p	Beta	Standard error	p	Beta	Standard error	p	Odds ratio	from	to
Male	-0.46*	0.05	0.00	-0.13*	0.01	0.00	-0.08*	0.01	0.00	2.35*	1.99	2.78
Age (months)	0.05*	0.00	0.00	0.01*	0.00	0.00	0.01*	0.00	0.00	1.02*	1.02	1.03
Household income	0.07*	0.01	0.00	0.02*	0.00	0.00	0.00*	0.00	0.02	0.88*	0.84	0.93
Parent/Guardian education	0.14*	0.03	0.00	0.02*	0.01	0.00	0.03*	0.00	0.00	1.03	0.96	1.11
Single parent	-0.05	0.05	0.33	0.00	0.01	0.76	-0.01	0.01	0.10	1.02	0.86	1.22

* significant at $p \leq 0.05$
Source: 2006 Aboriginal Children's Survey.

What is already known on this subject?

- Speech-language deficits are a prevalent form of developmental delay among Aboriginal children.
- Knowledge about Aboriginal children's language development is limited.

What does this study add?

- Based on data from the 2006 Aboriginal Children's Survey, four distinct language outcomes were derived: expressive language, mutual understanding, storytelling, and speech and language difficulties.
- Such indicators may be useful for research into Aboriginal children's language outcomes.

lower scores to have a speech-language difficulty, even when child age and gender, household income, parent/guardian education, and single parenthood were taken into account.

Discussion

Aboriginal-specific measures of children's language outcomes have been identified as an information gap.[18] This study describes how language indicators can be created from information collected in the ACS. Four distinct outcomes were derived: expressive language, mutual understanding, story-telling, and speech-language difficulties. Expressive language, a construct commonly assessed in the literature (albeit with standardized tools such as the Peabody Picture Vocabulary Test[25]), indicates children's ability to express themselves. Mutual understanding emphasizes the importance of a communicative partner and two-way interactions. Unique to this study is identification of story-telling as a language outcome, based on skills particularly valued in some Aboriginal cultures.[18] The final indicator, parent-reported speech-language difficulty, has been identified as particularly important for Aboriginal children.

Aboriginal children may learn language in a different way than do non-Aboriginal children. As a result, a culturally appropriate means of assessment may be needed. For example, traditional Inuit culture places greater emphasis on language comprehension than on expression in the early years, with parents/guardians defining language by the child's understanding of concepts and directives rather than by vocabulary.[45] Aboriginal children may use less expressive language (for instance, being called upon to speak less often), which might affect the interpretation of standardized test results.[24,28] Moreover, language difficulties may need to be considered in the context of the community or culture.[46] Gould[22] argued that the identification of speech and language disorders is hampered by over-reliance on standardized tools, which are frequently administered by non-Aboriginal assessors. Thus, although the measures in this study may reflect parent/guardian perceptions, these measures may also make allowance for cultural influences on language development.

Limitations

This study has several limitations. First, the factor structure and indicators cannot be generalized to the on-reserve population. Second, the items included in the four subscales are limited to those asked in the ACS, and it is likely that they do not fully represent similar concepts as in the general literature. For example, mutual understanding is defined here as the child's ability to understand language and to be understood, which may not be a construct typically assessed by standardized instruments. Ceiling effects were observed for several of the parent-/guardian-reported items. This suggests that a wider range of skills, as well as reports from multiple raters (for instance, observers, caregivers), might be considered for inclusion in future surveys. Finally, cultural influences that may affect how children learn languages were not explored in this study.

Conclusion

The current analysis describes four language indicators that can be derived from the Aboriginal Children's Survey: expressive language, mutual understanding, story-telling, and speech and language difficulties. This information is based on nationally representative data for First Nations children living off reserve, Métis children, and Inuit children, and is, therefore, useful to researchers investigating Aboriginal-specific language outcomes. ■

Acknowledgements

The authors gratefully acknowledge Cameron McIntosh, Rubab Arim and Amanda Thompson for their contributions to the manuscript. This paper was supported by the Strategic Research Directorate at Aboriginal Affairs and Northern Development Canada. The views expressed in this document do not necessarily represent the position of Aboriginal Affairs and Northern Development Canada.

References

1. Canadian Council on Learning. *The State of Learning in Canada*. Ottawa: Canadian Council on Learning, 2007.
2. Minister of Public Works and Government Services. *Aboriginal Head Start in Urban and Northern Communities: Program and Participants 2001*. Ottawa: Minister of Public Works and Government Services, 2002.
3. Findlay LC, Janz T. Health of First Nations children living off-reserve and Metis children younger than age 6. *Health Reports* 2012; 23(1): 31-9.
4. Findlay LC, Janz T. The health of Inuit children under age 6 in Canada. *International Journal of Circumpolar Health* 2012; 71.
5. de Leeuw S, Fiske J, Greenwood M. *Rural, Remote, and North of 51: Service Provision and Substance Abuse Related Special Needs in British Columbia's Hinterlands*. Prince George, British Columbia: University of Northern British Columbia Task Force on Substance Abuse, 2002.
6. Owens R. *Language Development. Fifth Edition*. Boston: Allyn and Bacon, 2001.
7. Heckman JJ. Skill formation and the economics of investing in disadvantaged children. *Science* 2006; 312(5782): 1900-2.
8. Arnold D. Co-occurrence of externalizing behavior problems and emergent academic difficulties in young high-risk boys: a preliminary evaluation of patterns and mechanisms. *Journal of Applied Developmental Psychology* 1997; 18: 317-30.
9. Sabol TJ, Pianta RC. Patterns of school readiness forecast achievement and socioemotional development at the end of elementary school. *Child Development* 2012; 83(1): 282-99.
10. Duncan GJ, Clasessen A, Huston A, et al. School readiness and later achievement. *Developmental Psychology* 2007; 43(6): 1428-46.
11. Justice L, Pence Turnbull KL, Bowles RP, Skibbe L. School readiness among children with varying histories of language difficulties. *Developmental Psychology* 2009; 45(2): 460-76.
12. Capute A. Using language to track development. *Patient Care* 1987; 21(19): 60-70.
13. Silva P, Williams S, McGee R. A longitudinal study of children with developmental language delay at age three: Later intelligence, reading and behaviour problems. *Developmental Medicine and Child Neurology* 1987; 26: 630-40.
14. Young AR, Beitchman JH, Johnson C, et al. Young adult academic outcomes in a longitudinal sample of early identified language impaired and control children. *Journal of Child Psychology and Psychiatry* 2002; 43(5): 635-45.
15. Ball J. Supporting young Indigenous children's language development in Canada: A review of research on needs and promising practices. *The Canadian Modern Language Review* 2009; 66(1): 19-47.
16. Health Canada. *First Nations Comparable Health Indicators*. Ottawa: Health Canada, 2005.
17. Smylie J. *Indigeneous Children's Health Report: Health Assessment in Action*. Toronto: Keenan Research Centre, 2009.
18. Ball J. *Aboriginal Young Children's Language and Literacy Development: Research Evaluating Progress, Promising Practices, and Needs*. Ottawa: Canadian Language and Literacy Networked Centre of Excellence, 2007.
19. Statistics Canada, Human Resources Development Canada. *National Longitudinal Survey of Children and Youth Users' Handbook and Microdata Guide* (Cycle 1, Release 2 (Microdata document 89M0015 GPE) Ottawa: Statistics Canada, 1996.
20. Human Resources and Skills Development Canada. *Summative Evaluation of the Understanding the Early Years Initiative*. Gatineau, Quebec: Human Resources and Skills Development Canada, 2011.
21. Ball J, Lewis M. Talking points: What can speech-language partners contribute to Aboriginal early childhood development? In: St. Aubin C, ed. *Compendium on Aboriginal Early Child Development*. Ottawa: Canadian Child Care Federation, 2005.
22. Gould J. Non-standard assessment practices in the evaluation of communication in Australian Aboriginal children. *Clinical Linguistics and Phonetics* 2007; 22(8): 643-57.
23. Bernhardt B, Ball J, Deby J. Cross-cultural issues in assessment of phonology. In: McLeod S, ed. *The International Guide to Speech Acquisition*. Albany, New York: Delmar Thomson Learning, 2007.
24. Bernacki Jonk,L. *Aboriginal and Non-Aboriginal Mothers' Views on Language Acquisition*. Winnipeg, Manitoba: University of Manitoba, 2009.
25. Dunn LM, Dunn L. *Examiners Manual for the PPVT-3: Peabody Picture Vocabulary Test Third Edition*. Circle Pines, Minnesota: American Guidance Service, 1997.
26. Gardner MF. *Expressive One-Word Picture Vocabulary Test-Revised*. Novato, California: Academic Therapy, 1990.
27. Ball J, Janyst P. *Screening and Assessment of Indigenous Children: Community-University Partnered Research Findings*. Policy brief presented at Early Years Policy Forum. Vancouver: 2008.
28. Pesco D. Language socialization in Canadian Aboriginal communities. In: Duff PA, Hornberger NH, eds. *Encyclopedia of Language and Education, Volume 8: Language Socialization*. New York: Springer Science and Business Media, 2008: 273-85.
29. Norris MJ. Canada's Aboriginal languages. *Canadian Social Trends* 1998; 51: 16.
30. Johnston JR, Wong MYA. Cultural differences in beliefs and practices concerning talk to children. *Journal of Speech, Language and Hearing Research* 2002; 45: 916-26.
31. Simmons N, Johnston JR. Cross-cultural difference in beliefs and practices that affect the language spoken to children: Mothers with Indian and Western heritage. *International Journal of Language and Communication Disorders* 2007; 42: 445-65.
32. Statistics Canada. *Aboriginal Children's Survey, 2006: Concepts and Methods Guide*. Ottawa: Minister of Industry, 2008.
33. Muthén LK, Muthén BO. *Mplus User's Guide. Sixth Edition*. Los Angeles, California: Muthén and Muthén, 2010.
34. Tabachnick BG, Fidell LS. *Using Multivariate Statistics. Fourth Edition*. Boston: Allyn and Bacon, 2001.
35. Hayton JC, Allen DG, Scarpello V. Factor retention decisions in Exploratory Factor Analysis: A tutorial on parallel analysis. *Organizational Research Methods* 2004; 7(2): 191-205.
36. Bentler PM. Comparative fit indexes in structural models. *Psychological Bulletin* 1990; 107: 238-46.
37. Tucker LR, Lewis C. A reliability coefficient for maximum likelihood factor analysis. *Psychometrica* 1973; 38: 1-10.
38. Brown MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA and Long JS, eds. *Testing Structural Equation Models*. Newbury Park, California: Sage Publications, 1993.
39. Hu L, Bentler PM. Cut-off criteria for fit indices in conventional criteria versus new alternative. *Structural Equation Modelling* 1999; 6: 1-55.
40. Lloyd JEV, Hertzman C. How neighborhoods matter for rural and urban children's language and cognitive development at kindergarten and grade 4. *Journal of Community Psychology* 2010; 38(3): 293-313.

41. Duncan GJ, Brooks-Gunn J, Klebanov PK. Economic deprivation and early childhood development. *Child Development* 1994; 65: 296-318.

42. Braves MF, Brunetti GJ, Slater WH. The reading vocabularies of primary-grade children of varying geographic and social backgrounds. In: Harris JA and Harris LA, eds. *New Inquiries in Reading Research and Instruction*. Rochester, New York: National Reading Conference, 1982: 99-104.

43. Magnuson K, Sexton H, Davis-Kean P, Huston A. Increases in maternal education and young children's language skills. *Merrill-Palmer Quarterly* 2009; 55: 319-50.

44. Rust K, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.

45. Crago M. Development of communicative competence in Inuit children: Implications for speech language pathology. *Communication Disorders Quarterly* 1990; 13: 73-83.

46. Eriks-Brophy A, Quittenbaum J, Anderson D, Nelson T. Part of the problem or part of the solution? Communication assessments of Aboriginal children residing in remote communities using videoconferencing. *Clinical Linguistics and Phonetics* 2008; 22: 589-609.